<u>IN THE CLAIMS</u>

Please cancel Claim 71 without prejudice to or disclaimer of the subject matter presented therein. The following is a complete listing of all the claims as currently pending.

Claims 1-18. (Canceled)

Claim 19. (Previously Presented): An image data processing apparatus that changes a dynamic range of an original image data, comprising:

a gradation conversion unit adapted to perform a gradation conversion on the original image data, based on a gradation conversion curve;

a high-frequency-component generation unit adapted to generate a high-frequency component of the original image data or an image data obtained from the gradation conversion performed on the original image data by said gradation conversion unit;

a conversion unit adapted to convert a magnitude of an amplitude of the high-frequency component; and

a control unit adapted to control an addition of the high-frequency component converted by said conversion unit, after performance of the gradation conversion on the original image data by said gradation conversion unit,

wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on information concerning an inclination of the gradation conversion curve.

Claim 20. (Previously Presented): An apparatus according to Claim 19, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on the information concerning the inclination of the gradation conversion curve and a pixel value obtained based on the original image data.

Claim 21. (Previously Presented): An apparatus according to Claim 19, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on a differential value of the gradation conversion curve.

Claim 22. (Previously Presented): An apparatus according to Claim 19, further comprising an input unit adapted to input a variable for changing a form of the gradation conversion curve.

Claim 23. (Previously Presented): An apparatus according to Claim 19, wherein said high-frequency-component generation unit generates a smoothened image data of the original image data, and generates the high-frequency component by subtracting the smoothened image data from the original image data.

Claim 24. (Previously Presented): An apparatus according to Claim 19, wherein said high-frequency-component generation unit generates a smoothened image data of the original image data after the gradation conversion, and generates the high-frequency component by subtracting the smoothened image data from the original image data after the gradation conversion.

Claim 25. (Previously Presented): An apparatus according to Claim 24, wherein the smoothened image data is formed by using a morphological filter.

Claim 26. (Previously Presented): An apparatus according to Claim 19, wherein said gradation conversion unit converts a form of the gradation conversion curve, based on a feature amount calculated based on the original image data.

Claim 27. (Previously Presented): An image data processing apparatus comprising:

a smoothening unit adapted to obtain a smoothened image data from an original image data;

a high-frequency-component generation unit adapted to generate, as a high-frequency component, a difference between the smoothened image data obtained by said smoothening unit and the original image data;

a gradation conversion unit adapted to convert a gradation of the original image data by using a gradation conversion curve;

a second smoothening unit adapted to obtain a second smoothened image data from an image data obtained from the gradation conversion performed by said gradation conversion unit; and

a high-frequency-component addition unit adapted to add the high-frequency component to the second smoothened image data.

Claim 28. (Previously Presented): An apparatus according to Claim 27, wherein said high-frequency-component addition unit changes an amplitude of the high-frequency component, based on a pixel value obtained based on the original image data, and adds the high-frequency component whose amplitude has been changed to the second smoothened image data.

Claims 29 and 30. (Canceled)

Claim 31. (Previously Presented): An image data processing apparatus comprising:

a smoothening unit adapted to obtain a smoothened image data from an original image data;

a high-frequency-component generation unit adapted to generate, as a high-frequency component, a difference between the smoothened image data obtained by said smoothening unit and the original image data;

a gradation conversion unit adapted to convert a gradation of the original image data by using a gradation conversion curve;

a conversion unit adapted to convert a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition unit adapted to add the high-frequency component whose magnitude of the amplitude has been changed by said conversion unit to the image data whose gradation has been converted.

Claim 32. (Previously Presented): An apparatus according to Claim 31, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on information concerning the inclination of the gradation conversion curve and a pixel value obtained based on the original image data.

Claim 33. (Previously Presented): An image data processing apparatus comprising:

a gradation conversion unit adapted to obtain a converted image data by converting a gradation of an original image data;

a smoothening unit adapted to obtain a smoothened image data by smoothing the converted image data;

a high-frequency-component generation unit adapted to obtain, as a high-frequency component, a difference between the smoothened image data and the converted image data;

a conversion unit adapted to convert a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition unit adapted to add the high-frequency component whose magnitude of the amplitude has been converted by said conversion unit to the converted image data.

Claim 34. (Previously Presented): An apparatus according to Claim 33, wherein said conversion unit converts the magnitude of the amplitude of the high-frequency component, based on information concerning the inclination of the gradation conversion curve and a pixel value obtained based on the original image data.

Claims 35 and 36. (Canceled)

Claim 37. (Previously Presented): An image data processing method comprising:

a high-frequency-component conversion step of converting an amplitude of a high-frequency component of an image data, based on information concerning an inclination of a gradation conversion curve; and

an addition step of adding the high-frequency component, converted in said high-frequency-component conversion step, to an arbitrary image data.

Claim 38. (Previously Presented): An apparatus according to Claim 23, wherein the smoothened image data is formed by using a morphological filter.

Claim 39. (Previously Presented): An image data processing method for changing a dynamic range of an original image data, comprising:

a gradation conversion step of performing a gradation conversion on the original image data, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image data or an image data obtained from the gradation conversion performed on the original image data in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

a control step of controlling an addition of the high-frequency component converted in said conversion step, after performance of the gradation conversion on the original image data in said gradation conversion step,

wherein said conversion step includes converting the amplitude of the high-frequency component, based on information concerning an inclination of the gradation conversion curve.

Claim 40. (Previously Presented): An image data processing method comprising:

a smoothening step of obtaining a smoothened image data from an original image data;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image data obtained in said smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image data by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image data from an image data obtained from the gradation conversion performed in said gradation conversion step; and

a high-frequency-component addition step of adding the high-frequency component to the second smoothened image data.

Claim 41. (Canceled)

Claim 42. (Previously Presented): An image data processing method comprising:

a smoothening step of obtaining a smoothened image data from an original image data;

a high-frequency component generation step of generating, as a high-frequency component, a difference between the smoothened image data obtained in said smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image data by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been changed in said conversion step to the image data whose gradation has been converted.

Claim 43. (Previously Presented): An image data processing method comprising:

a gradation conversion step of obtaining a converted image data by converting a gradation of an original image data;

a smoothening step of obtaining a smoothened image data by smoothing the converted image data;

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image data and the converted image data;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image data.

Claim 44. (Previously Presented): A program product embodying a program for executing an image data processing method for changing a dynamic range of an original image data, the method comprising:

a gradation conversion step of performing a gradation conversion on the original image data, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image data or an image data obtained from the gradation conversion performed on the original image data in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

a control step of controlling an addition of the high-frequency component converted in said conversion step, after performance of the gradation conversion on the original image data in said gradation conversion step,

wherein said conversion step includes converting the magnitude of the

amplitude of the high-frequency component, based on information concerning an

inclination of the gradation conversion curve.

Claim 45. (Previously Presented): A program product embodying a program

for executing an image data processing method, the method comprising:

a smoothening step of obtaining a smoothened image data from an original

image data;

a high-frequency-component generation step of generating, as a high-

frequency component, a difference between the smoothened image data obtained in said

smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image

data by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image data

from an image data obtained from the gradation conversion performed in said gradation

conversion step; and

a high-frequency-component addition step of adding the high-frequency

component to the second smoothened image data.

Claim 46. (Canceled)

Claim 47. (Previously Presented): A program product embodying a program for executing an image data processing method, the method comprising:

a smoothening step of obtaining a smoothened image data from an original image data;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image data obtained in said smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image data by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has bean changed in said conversion step to the image data whose gradation has been converted.

Claim 48. (Previously Presented): A program product embodying a program for executing an image data processing method, the method comprising:

a gradation conversion step of obtaining a converted image data by converting a gradation of an original image data;

a smoothening step of obtaining a smoothened image data by smoothing the converted image data;

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image data and the converted image data;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image data.

Claim 49. (Previously Presented): A storage medium storing a program for executing an image data processing method for changing a dynamic range of an original image data, the method comprising:

a gradation conversion step of performing a gradation conversion on the image data, based on a gradation conversion curve;

a high-frequency-component generation step of generating a high-frequency component of the original image data or an image data obtained from the gradation conversion performed on the original image data in said gradation conversion step;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

a control step of controlling an addition of the high-frequency component converted in said conversion step, after performance of the gradation conversion on the original image data in said gradation conversion step,

wherein said conversion step includes converting the magnitude of the amplitude of the high-frequency component, based on information concerning an inclination of the gradation conversion curve.

Claim 50. (Previously Presented): A storage medium storing a program for executing an image data processing method, the method comprising:

a smoothening step of obtaining a smoothened image data from an original image data;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image data obtained in said smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image data by using a gradation conversion curve;

a second smoothening step of obtaining a second smoothened image data from an image data obtained from the gradation conversion performed in said gradation conversion step; and

a high-frequency-component addition step of adding the high-frequency component to the second smoothened image data.

Claim 51. (Canceled)

Claim 52. (Previously Presented): A storage medium storing a program for executing an image data processing method, the method comprising:

a smoothening step of obtaining a smoothened image data from an original image data;

a high-frequency-component generation step of generating, as a high-frequency component, a difference between the smoothened image data obtained in said smoothening step and the original image data;

a gradation conversion step of converting a gradation of the original image data by using a gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of the gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been changed in said conversion step to the image data whose gradation has been converted.

Claim 53. (Previously Presented): A storage medium storing a program for executing an image data processing method, the method comprising:

a gradation conversion step of obtaining a converted image data by converting a gradation of an original image data;

a smoothening step of obtaining a smoothened image data by smoothing the converted image data;

a high-frequency-component generation step of obtaining, as a high-frequency component, a difference between the smoothened image data and the converted image data;

a conversion step of converting a magnitude of an amplitude of the high-frequency component, based on a value concerning an inclination of a gradation conversion curve; and

a high-frequency-component addition step of adding the high-frequency component whose magnitude of the amplitude has been converted in said conversion step to the converted image data.

Claim 54. (Previously Presented): An apparatus according to Claim 19, further comprising:

radiation generation means for irradiating radiation rays onto an object; and

a two-dimensional X-ray sensor for converting radiation rays transmitted through the object into an image data,

wherein the image data obtained by said two-dimensional X-ray sensor serves as the original image data.

Claim 55. (Previously Presented): An image data processing apparatus comprising:

storage means for storing information concerning a gradation conversion curve;

high-frequency component generation means for generating a high-frequency component of an image data, or of an image data obtained by performing gradation conversion on the image data using the gradation conversion curve;

conversion means for converting a magnitude of an amplitude of the high-frequency component; and

addition means for adding the converted high-frequency component to the image data, or to the image data obtained by performing the gradation conversion on the image data using the gradation conversion curve,

wherein said conversion means converts the amplitude of the high-frequency component on the basis of the information concerning the gradation conversion curve.

Claim 56.(Previously Presented): An apparatus according to Claim 55, wherein said conversion means converts the magnitude of the amplitude of the high-frequency component on the basis of the information concerning an inclination of the gradation conversion curve.

Claim 57. (Previously Presented): An apparatus according to Claim 55, wherein said conversion means converts the magnitude of the amplitude of the

high-frequency component on the basis of a differential value of the gradation conversion curve.

Claim 58. (Previously Presented): An apparatus according to Claim 55, further comprising input means for inputting a variable for changing a curve form of the gradation conversion curve.

Claim 59. (Previously Presented): An apparatus according to Claim 55, wherein said high-frequency component generation means generates a smoothed image data from the image data and subtracts the smoothed image data from the image data, thereby to generate the high-frequency component.

Claim 60. (Previously Presented): An apparatus according to Claim 59, wherein the smoothed image data is formed by using a morphological filter.

Claim 61. (Previously Presented): An apparatus according to Claim 55, wherein said high-frequency component generation means generates a smoothed image data from the image data after the gradation conversion, and subtracts the smoothed image data from the image data after the gradation conversion, thereby to generate the high-frequency component.

Claim 62. (Previously Presented): An apparatus according to Claim 61, wherein the smoothed image data is formed by using a morphological filter.

Claim 63. (Previously Presented): An apparatus according to Claim 55, wherein a curve form of the gradation conversion curve is changed according to a feature amount calculated based on the image data.

Claim 64. (Previously Presented): An apparatus according to Claim 55, further comprising:

radiation generation means for irradiating radiation rays onto an object; and

a two-dimensional X-ray sensor for converting the radiation ray transmitted through the object into an image data,

wherein the image data obtained by said two-dimensional X-ray sensor serves as the original image data.

Claim 65. (Previously Presented): An image data processing method comprising:

a storage step of storing information concerning a gradation conversion curve;

a high-frequency component generation step of generating a high-frequency component of an image data or an image data obtained by performing gradation conversion on the image data using the gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

an addition step of adding the converted high-frequency component to the image data, or to the image data obtained by performing the gradation conversion on the image data using the gradation conversion curve,

wherein said conversion step includes converting the amplitude of the high-frequency component on the basis of the information concerning the gradation conversion curve.

Claim 66. (Previously Presented): A program for executing an image data processing method comprising:

a storage step of storing information concerning a gradation conversion curve;

a high-frequency component generation step of generating a high-frequency component of an image data or an image data obtained by performing gradation conversion on the image data using the gradation conversion curve;

a conversion step of converting a magnitude of an amplitude of the high-frequency component; and

an addition step of adding the converted high-frequency component to the image data, or to the image data obtained by performing the gradation conversion on the image data using the gradation conversion curve,

wherein said conversion step includes converting the amplitude of the high-frequency component on the basis of the information concerning the gradation conversion curve.

Claim 67. (Previously Presented): A storage medium which stores a program for executing an image data processing method, said method comprising:

a storage step of storing information concerning a gradation conversion curve;

a high-frequency component generation step of generating a high-frequency component of an image data, or of an image data obtained by performing gradation conversion on the image data using the gradation conversion curve;

a conversion step of converting a magnitude o£ an amplitude of the high-frequency component; and

an addition step of adding the converted high-frequency component to the image data, or to the image data obtained by performing the gradation conversion on the image data using the gradation conversion curve,

wherein said conversion step includes converting the amplitude of the high-frequency component on the basis of the information concerning the gradation conversion curve.

Claim 68. (Canceled)

Claim 69. (Previously Presented): An image data processing apparatus

comprising:

a high-frequency-component conversion unit adapted to convert an

amplitude of a high-frequency component of an image data, based on information

concerning an inclination of a gradation conversion curve; and

an addition unit adapted to add the high-frequency-component, converted in

said high-frequency-component conversion unit, to an arbitrary image data.

Claim 70. (Previously Presented): An apparatus according to Claim 69,

wherein the addition unit adds the converted high-frequency component to the image data

or the image obtained by gradation-converting the image data based on the gradation

conversion curve.

Claim 71. (Canceled)

Claim 72. (Previously Presented): A apparatus according to Claim 69,

further comprising a gradation conversion unit adapted to gradation-convert the image data

based on the gradation conversion curve,

wherein said addition unit adds the converted high-frequency component to

the gradation-converted image.

Claim 73. (Previously Presented): An apparatus according to Claim 69, further comprising a high-frequency component generation unit adapted to generate a smoothed image from the image data and subtract the smoothed image data from the image data, thereby generating the high-frequency component.

Claim 74. (Previously Presented): An apparatus according to Claim 69, further comprising:

an radiation generation unit adapted to irradiate radiation rays onto an object; and

a two-dimensional X-ray sensor adapted to convert the radiation ray transmitted through the object into an image data,

wherein the image obtained by said two-dimensional X-ray sensor serves as the image.

Claim 75. (Previously Presented): A program product embodying a program for executing an image data processing method comprising:

a high-frequency-component conversion step of converting an amplitude of a high-frequency component of an image data, based on information concerning an inclination of a gradation conversion curve; and

an addition step of adding the high-frequency component, converted in said high-frequency-component conversion step, to an arbitrary image data.

Claim 76. (Previously Presented): A storage medium storing a program for executing an image data processing method comprising:

a high-frequency-component conversion step of converting an amplitude of a high-frequency component of an image data, based on information concerning an inclination of a gradation conversion curve; and

an addition step of adding the high-frequency component, converted in said high-frequency-component conversion step, to an arbitrary image data.